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XLIV.—*On some External Characters of Ruminant Artiodactyla.*—Part VI. *The* Bovinæ. By R. I. Pocock, F.R.S.

Subfamily *Bovinæ*.

I retain this subfamily as a matter of convenience only, being unacquainted with a single character of importance by which it may be distinguished from the Tragelaphinæ. On the other hand, close affiliation between the two is attested by a large number of common characters. Indeed, *Anoa depressicornis*, the most primitive form of Bovinæ, quite commonly shows the typically Tragelaphine white spots and patches on the face, throat, and feet, which must be regarded as strong evidence of near affinity with the Tragelaphine stock, as I pointed out in 1910.

For close upon a century there has been great divergence of opinion regarding the status of the groups into which the species of the Bovinæ naturally fall. In 1827 Hamilton Smith split up the Linnæan genus *Bos* into a number of sub-genera—*Bison*, *Bibos*, etc. By Gray, who added *Poephagus* to the series, these were granted generic rank. In this opinion he was followed by Rütimeyer, and more recently by Matschie. English authors, like Blanford, Flower, and Lydekker, on the contrary, retained the genus *Bos* in a comprehensive sense, giving subordinate rank to the others. In 1910 I followed that course, being unable to find evidence from the characters I was then working at for defining the

alleged genera and subgenera. Since that year, however, study of certain other external features—notably the rhinarium and penis—have supplied additional characters to those derived from the skull, horns, tail, distribution of hair, and outward form, which, I think, justify Gray's claim that the groups are worthy of generic recognition. Probably other characters bearing out this view will come to light with the examination of further material.

So far as the cutaneous glands are concerned, the genera have the following mainly negative features in common :—

Preorbital glands, as in all African Tragelaphines, are absent.

Inguinal glands are invariably absent, as in the Tragelaphine genera *Taurotragus*, *Boselaphus*, and *Tetraceros*.

Pedal glands of the interdigital type are also invariably absent, as in all Tragelaphines.

Glands on *the false hoofs* are absent, as in *Tragelaphus*.

Two pairs of *mammæ* are present, as in all Tragelaphines.

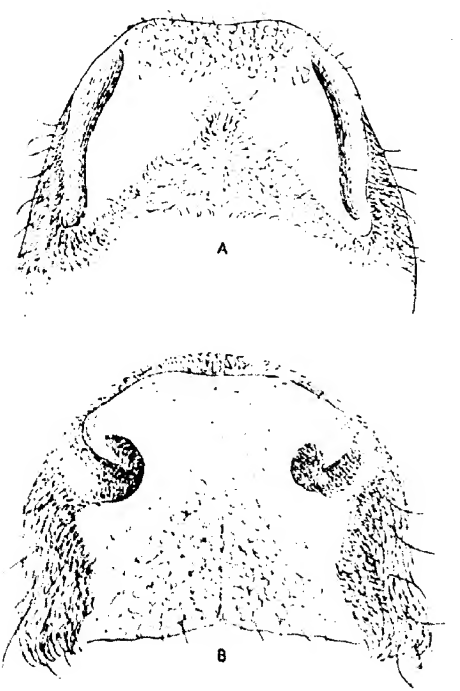
Genus Bos, Linn.

Bos, Linn. Syst. Nat. ed. 10, p. 1758 : type, *taurus*.

Rhinarium (figs. 1, A, B ; 3, C) large ; viewed from the front its upper margin is evenly convex from side to side and the median area below the line of the widely separated expanded nostrils is wider than the internarial septum throughout its extent, the hairs of the upper lip extending inwards neither beneath the nostrils above nor along the edge of the upper lip below ; above the edge of the lip there runs upwards a short shallow median groove, which is present in all genera, and thus disproves Lydekker's statement (Cat. Ung. in Brit. Mus. i. p. 11, 1912) that the rhinarium in the Bovinæ is undivided. A few scattered hairs arise from the rhinarium inferiorly, and its surface is sculptured and reticulated. The anterior portion of its dorsal surface is exposed to a varying degree in accordance with the extent to which the hair of the upper side of the muzzle spreads forwards between the nostrils ; but the naked upper edge of the nostrils is always of considerable width and depth, and not narrowed as in *Bison* and *Poephagus*. The extension of the hair between the nostrils above varies according to the breed, being greater, for instance, in British park cattle (*B. taurus*) than in Indian humped cattle (*B. indicus*) ; but intergradation between these two forms seems to be supplied by other breeds of *B. taurus*.

The *penis* of *B. taurus*, as figured by Garrod (Proc. Zool. Soc. 1877, p. 10, fig. 19) is well known. It ends in an ovately rounded knob or cushion, on the lower side of which the orifice of the urethra terminates without running out into a definite tubular prolongation. In *B. indicus* (fig. 4, B, C) the penis is of a similar type.

Fig. 1.

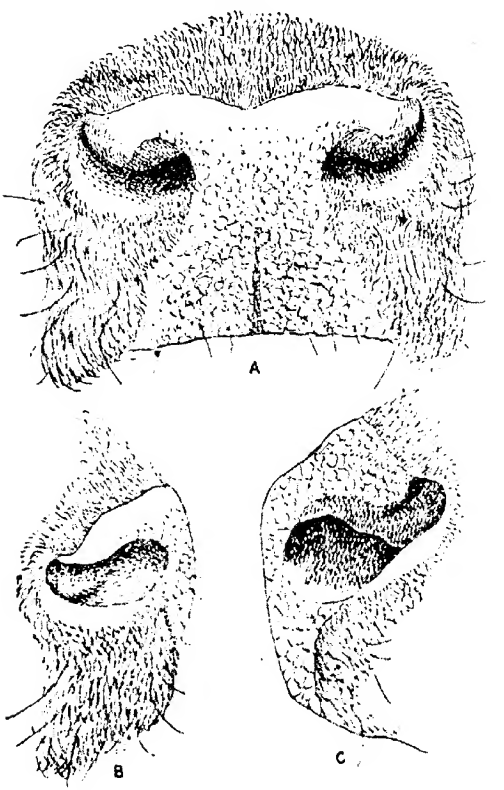


A. Rhinarium of zebu (*Bos indicus*) from above. × ⅓.
B. The same from the front.

The only existing members of this genus, as here recorded, are the numerous domesticated breeds of cattle referred to *B. taurus* and *B. indicus*. Apart from these there are a certain number of extinct species, of which the aurochs

(*B. primigenius*) is the best-known form. In domesticated cattle the skull is so variable in structure that it would

Fig. 2.

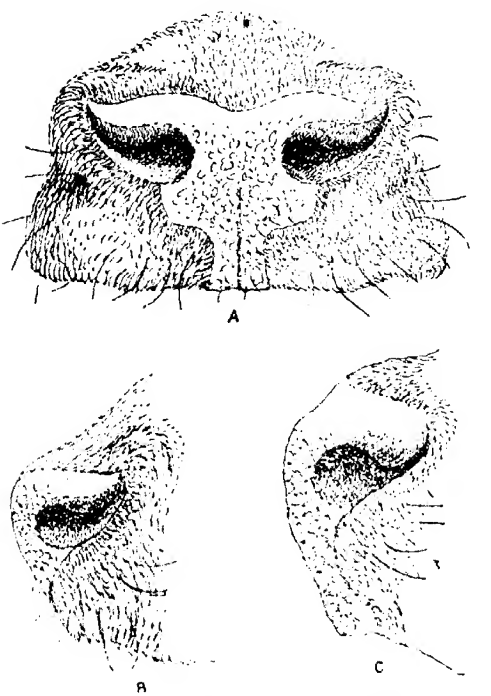


A. Rhinarium of American bison (*Bison bison*) from the front. × ½.
B. The same from the side.
C. The same of African buffalo (*Syncerus caffer æquinoctialis*) from the side.

require the examination of a long series of specimens to formulate a generic diagnosis based upon cranial characters.

But the success of such an undertaking would be doubtful, seeing that the skulls of some domesticated breeds differ more from aurochs-like breeds than the latter differ from other genera of Bovinæ. To this variability is probably to

Fig. 3.



A. Rhinarium of yak (*Poephagus grunniens*) from the front. × ½.
B. The same from the side.
C. The same of zebu (*Bos indicus*). × ½.

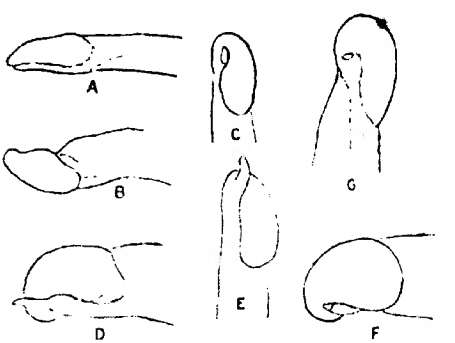
be attributed in a great measure the prevalent admission of subgeneric rank to the groups into which the existing species of Bovinæ fall. The ears are no less variable in size and shape than the skull and horns, even in closely related breeds.

Genus Bibos, Hodgson.

Bibos, Hodgson, Journ. Asiatic Soc. Bengal, vi. p. 499 (1837): type, *gaurus*, H. Smith.
Gaveus, Hodgson, *op. cit.* xvi. p. 706 (1847): type, *frontalis*.
Gauribos, *Uribos*, *Bubalibos*, Heude, Mém. Hist. Nat. Chin. v. pt. i. p. 3 (1901): types (now selected) respectively *laosiensis*, *platyceros*, *annamiticus*, Heude.

The *rhinarium* of the two forms I have examined—namely, *frontalis*, which is almost certainly a domesticated breed of *B. gaurus*, and *banteng*—does not differ in any important

Fig. 4.



A. End of penis of African buffalo (*Syncerus caffer equinoctialis*) from the left side.
B. The same of zebu (*Bos indicus*).
C. The same from below.
D. The same of banteng (*Bibos banteng*) from left side.
E. The same of gayal (*Bibos frontalis*) from below.
F. The same of American bison (*Bison bison*) from the side.
G. The same from below.

respects from that of *Bos*, although the dorsal surface seems to be less overgrown with hair than even in *B. indicus*. The hair encroaches only to a slight extent between the posterior angles of the nostrils, so that the posterior border of the upper side is lightly concave. This feature may, however, prove to be variable. In the feet the interungual integument is naked as in *Bos*, not hairy as in *Bison*.

The *penis* (fig. 4, D, E) in both the above-mentioned species differs from that of *Bos* in that the urethral canal is

produced into a short tube free from the terminal cushion-like thickening of the glans, as in *Poephagus* (*cf. infra*).

Genus Bison, H. Smith.

Bison, H. Smith, Griffiths, An. King. v. p. 373 (1827): type, *bison*, Linn.

Bonasus, Wagner, Schreb. Säug., Suppl. iv. p. 515 (1844): type, *bonasus*, Linn.

The *rhinarium* (fig. 2, A, B) differs from that of *Bos* and *Bibos* in being more overgrown with hair both above and in front. In front the hair of the upper lip spreads towards the middle line along the lower margin of the nostrils and even penetrates the inner portion of those orifices. Hence at this level the rhinarium is not wider than the internarial septum. Inferiorly, however, it expands, and is broad where it passes into the edge of the upper lip. Dorsally the hair of the nose spreads over the upper surface of the rhinarium almost to its anterior margin, leaving a comparatively narrow naked rim bordering the nostrils above, so that from the anterior aspect the upper edge of the rhinarium does not present the evenly convex upper margin seen in *Bos* and *Bibos*.

The *feet* also differ from those of the two last-mentioned genera in having the interungual web overgrown with hair, which is sometimes stuck together with secretion. This hairy clothing has been observed in two pure-bred specimens, male and female, which died at different seasons of the year. Hence it may be inferred that the growth of hair on this part of the foot is not a seasonal character, as it appears to be in some of the Caprine Ruminants—*e. g.*, *Ammotragus lervia* and *Ovis musimon* *.

The *penis* (fig. 4, F, G), like that of *Bos*, has no free prolongation of the urethral canal.

Although I have cited *Bonasus* as a synonym of *Bison*, it must be explained that that course is justified mainly by inference, since I have had no opportunity of examining fresh material of the European species, *B. bonasus*, which is

* Some of the American bisons that have been imported into England as pure-bred stock appear from the higher carriage of the head, higher withers, longer horns, and other points to have *taurus*-blood in their veins. They are hybrids known as cattaloes in the United States. One of these had the interungual integument of the hind feet naked as in *Bos taurus*, whereas the interungual skin of the fore feet was covered with a growth of short hairs, being intermediate in this respect between the naked condition seen in *B. taurus* and the long-haired condition seen in *Bison bison*.

a very distinct species from its American ally *B. bison*, and so far as external appearance is concerned, especially as regards the higher, flatter hind-quarters, serves to connect the type of *Bison* with *Bos*. Nothing is known of its feet or penis. Nevertheless, judging from living examples, the rhinarium seems to be shaped like that of *Bison bison*.

Genus Poephagus, Gray.

Poephagus, Gray, List Mamm. Brit. Mus. p. 153 (1843); id. Cat. Ung. Brit. Mus. p. 39 (1852): type and only species, *grunniens*, Linn.

The *rhinarium* (fig. 3, A, B) is low and depressed and the whole of the upper surface is covered with short hair except for a comparatively narrow strip running along the upper margin of the nostrils. Beneath the inner edges of the nostrils in front the rhinarium is a little wider than the internarial septum, but the lower portion of its anterior surface is largely overgrown by the hairs of the upper lip, which encroach towards the middle line, leaving a median naked philtrum which is narrower than the internarial septum. In this last-mentioned particular the rhinarium of *Poephagus* differs from that of all other genera of Bovinæ.

The *penis*, as recorded by Lönnberg (Ark. Zool. Stockholm, (5) v. no. 10, 1909), has a short tubular urethral prolongation free from the terminal glandular thickening, apparently exactly as in *Bibos frontalis* and *banteng*.

Genus Anoa, H. Smith.

Anoa, H. Smith, Griffiths, Anim. King. v. pp. 355, 827, as subgenus of *Antilope*: type, *depressicornis*, H. Smith.
Bubalus, id. *op. cit.* p. 371: type, *bubalis* (= *bubalus*, Linn.).
Buffelus, Rafinesque, Verh. Ges. Basel, (2) iv. p. 331 (1835): type, now selected, *bubalus*, Linn. (= *arnee*, Kerr).
Probubalus, id. *loc. cit.*: type *depressicornis* (= *celebensis*, Rafin.).

The *rhinarium* of the two very distinct species I have examined—namely, *depressicornis* and *bubalis*—seems to resemble that of *Bos* and *Bibos* in all essential characters, exhibiting a large naked dorsal area and a nearly parallel-sided area below the level of the nostrils in front, which is wider than the internarial septum.

The *feet* have the interungual integument naked.

The *penis* I have not examined, but according to Lönnberg (Nova Acta Soc. Upsal. (3) xx. p. 60, pl. ii. fig. 16, 1903) there is no definite tubular urethral prolongation in *A. depressicornis*. His figure, nevertheless, suggests the presence

of a short urethral process. The statement, however, must be accepted in preference to the figure.

Genus Syncerus, Hodgson.

Syncerus, Hodgson, Journ. Asiat. Soc. Bengal, xvi. pt. 2, p. 709 (1847): type, *brachyceros*, Gray.

Planiceros, Gray, Cat. Rum. Brit. Mus. p. 10 (1872), as subgenus of *Bubalus*: type, *planiceros*, Blyth (= *centralis*, Gray).

Syceros, id. *op. cit.* p. 12, as subgenus of *Bubalus*: type, *caffer*, Sparm.

Apart from the shape of the head, horns, and the size of the ears, I am not acquainted with any important external characters by which the African buffaloes may be distinguished from their Asiatic allies. My examination, however, is restricted to one example—a young bull—of *S. caffer aequinoctialis*? In this specimen the *penis* was thinner than in other Bovines, and there was no trace of a tubular prolongation of the urethral canal free from the terminal thickening of the glans (fig. 1, A). A side view of the large *rhinarium* is shown in fig. 2, C.

Rütimeyer long ago pointed out some of the cranial differences between the African and Asiatic buffaloes, and, admitting them as distinct genera, adopted the name *Bubalus* for the former and introduced *Buffelus* for the latter. For no very good reasons, apparently, he severed the anoa (*B. depressicornis*) from the Asiatic forms and proposed *Probubalus* for its reception.

In 1901 Lönnberg (K. Svenska Vet.-Akad. Handl. xxxv. no. 3) adopted Rütimeyer's opinion as to the generic status of the two types of buffalo, and backed it by the addition of other cranial features. At the same time he showed that the anoa falls into line with the big buffaloes of India, the link between the two being supplied by *mindorensis*. He followed Rütimeyer also in the matter of nomenclature, with the exception that *Probubalus* lapsed as a synonym of *Buffelus*. Nevertheless, in 1903 (N. Acta Soc. Upsal. (3) xx. pp. 55–61) Lönnberg writes on the soft anatomy of *Anoa* as if it were a genus apart from other Asiatic buffaloes. The reason for this course is not clear.

In 1911 Hollister (P. Biol. Soc. Wash. xxiv. p. 191) adopted the views of Rütimeyer and Lönnberg regarding the buffaloes of Africa and India, without, however, being aware, so far as can be judged, of their publications upon this subject. Not possessing a skull of *depressicornis* for examination, he left *Anoa* alone, adopting the name *Bubalus* for

the Asiatic forms and *Syncerus* for the African. In this matter he was perfectly correct, if *Anoa* be left out of consideration. But if, as seems to be the case, *depressicornis* is not generically, or even subgenerically, distinguishable from *bubalis*, the name *Anoa* must supersede *Bubalus* for the Asiatic buffaloes by virtue of page priority.

In view of the distinguishing cranial characters between the African and Asiatic buffaloes pointed out by the above-quoted authors, it seems impossible to escape from the conclusion that the two groups deserve generic separation. From lack of material for examination I am unable to add any new external features to those that have been already published. Hollister's statement, however, that the ears of African buffaloes (*Syncerus*) are distinguished from those of Asiatic buffaloes (*Anoa*) by being heavily fringed is not always true. The ears, nevertheless, as I pointed out in 1912 ('Field,' Aug., p. 395), are very different in shape, those of the Asiatic buffaloes being narrower and much more pointed than of their African allies.

Setting aside the characters derived from the shape of the head, the horns, the height of the withers, the length and bushiness of the tail, the distribution of hair on the body, and others that have been made use of by previous workers who have adopted subgeneric or generic titles for the Bovine groups, the incidence of the external features to which attention has been particularly directed in this paper to support the generic recognition of these groups may be briefly summarized as follows:—

(1) *a*. Rhinarium reduced inferiorly by the encroachment of the hair of the lower half of the upper lip to form a distinct philtrum which is narrower than the internarial septum; its upper surface overgrown with short hair up to the anterior margin, leaving a narrow naked rim above the nostrils ..... *Poephagus.*

b. Rhinarium very wide inferiorly above the edge of the upper lip, wider than the internarial septum, and forming no distinct philtrum; the hairs of the muzzle spreading inwards beneath the nostrils and entering the inner angles of those orifices, reducing the width of the rhinarium at this level; its upper surface covered with hair almost to the anterior edge, so that only a narrow naked rim borders the nostrils above ..... *Bison.*

	c. Rhinarium large and naked, everywhere wide below the level of the nostrils in front, its dorsal surface overgrown posteriorly between the nostrils to a varying extent, but never sufficiently to reduce the upper edge of the nostrils to a narrow naked rim	*Bos, Bibos, Anoa, Syncerus.*
(2)	*a.* Feet with the interungual integument overgrown with hair.....	*Bison.*
	b. Feet with the interungual integument naked	*Bos, Bibos, Poephagus, Anoa, Syncerus.*
(3)	*a* Penis with a short tubular urethral process free for a short distance from the terminal thickening of the glans.....	*Bibos, Poephagus.*
	b. Penis without tubular urethral process ..	*Bos, Bison, Anoa, Syncerus.*

XLV. — *Notes on Fossorial Hymenoptera.* — XXXVI. *On new African* Philanthinæ. By Rowland E. Turner, F.Z.S., F.E.S.

Philanthus jussulatus, sp. n.

♀. Nigra; clypeo, mandibulis basi, scapo subtus, facie usque ad emarginationem oculorum, fronte macula, femoribus anticis subtus, femoribusque intermediis macula parva apicali flavis; pronoto margine postico, callis humeralibus, tegulis, mesopleuris antice, postscutello, tergito primo macula utrinque, secundo fascia obliqua utrinque, tertio, quarto quintoque fascia apicali, sexto macula magna utrinque, sternitis 3–5 fascia undulata antice bisinuata, secundo fascia lata postice emarginata, sexto fere toto, tibiis tarsisque albidis; flagello, coxis, trochanteribus, femoribus, segmentis abdominalibus primo, secundo, sextoque, tertio apice quintoque basi ferrugineis; alis hyalinis, venis fuscis, stigmate costaque testaceis.

Long. 10 mm.

♀. Clypeus very broadly rounded anteriorly, with a few scattered and shallow punctures; antennæ inserted nearer to the eyes than to each other, the front between them distinctly swollen. Front very closely and finely punctured-rugulose, the vertex much more strongly punctured. Antennæ not very stout; second joint of the flagellum slender at the base, gradually thickened to the apex, about

as long as the third and fourth joints combined, third joint a little broader at the apex than long. Ocelli in a broad triangle, the posterior pair fully half as far again from each other as from the eyes. Pronotum as broad as the mesonotum, smooth and shining, the mesonotum shining, with large and rather sparse punctures; scutellum and postscutellum shining, the former with a few small punctures. Tergites shining, rather closely covered with large and very deep punctures, on the fourth tergite the punctures become sparser and shallow at the apex, those on the fifth tergite are small and scattered, sixth tergite almost smooth; sternites shallowly and sparsely punctured. Median segment finely and closely punctured; the basal triangular area large, covering almost all the dorsal surface, smooth and shining with a well-marked median sulcus and without marginal carinæ. Cubitus of the hind wing interstitial with the transverse median nervure, the fore wings with a small fuscous cloud at the extreme apex.

Hab. Bohotle, Somaliland (*A. F. Appleton*).

Easily distinguished by the very coarse puncturation of the tergites. Nearly allied to the group of *P. venustus*, Rossi.

Philanthus flagellarius, sp. n.

♀ Nigra; mandibulis, apice excepto, clypeo, facie infra antennis tegulisque macula basali pallide flavis; tibiis tarsisque anticis femoribusque anticis intra flavo testaceis; tibiis tarsisque intermediis posticisque, femoribusque intermediis posticisque apice extremo testaceis; abdomine rufo-testaceo, basi flavescente; alis fusco-hyalinis, venis nigris, stigmate testaceo; antennis crassissimis.

Long. 12 mm.

♀. Clypeus rounded at the apex, shining, shallowly and very sparsely punctured; front very finely and closely longitudinally rugulose, vertex punctured, the punctures more or less confluent transversely; posterior ocelli as far from each other as from the eyes. Antennæ very stout; second joint of the flagellum rapidly broadened from the base, almost as broad at the apex as long, scarcely longer than the third joint; the third to tenth joints broader than long. Mesonotum and mesopleuræ closely and rather coarsely punctured, scutellum and postscutellum more closely and finely punctured; median segment irregularly rugulose on the sides and on the apical slope; the triangular dorsal area rugose, margined by distinct grooves. The two

basal tergites subopaque, without distinct punctures; the apical tergites shining, with a few small and scattered punctures; sternites shining, sparsely but more strongly punctured; the second sternite smooth, except at the apex. Cubitus of the hind wing originating just beyond the transverse median nervure.

Hab. Usangu District, German East Africa, 3500 to 4500 ft. (*S. A. Neave*), December; Lilongwe District, Central Angoniland, 4000 to 5000 ft. (*S. A. Neave*), May 28–June 2, 1910.

Somewhat resembles *P. dolosus*, Kohl, but is easily distinguished by the very stout flagellum and the sculpture of the scutellum and median segment.

†*Philanthus fuscipennis*, Guér.

Philanthus fuscipennis, Guér. Iconogr. regn. anim. iii., Insect. p. 443 (1845).

Philanthus consimilis, Kohl, Ann. Naturh. Hofmus. Wien, vi. p. 349 (1891). ♂ ♀.

Philanthus reticulatus, Cameron, Sjöstedt, Kilimandjaro-Meru Exp., Zool. ii. p. 270 (1910).

Hab. The whole Ethopian region.

A very variable species in colour; the yellow markings on the scutellum and postscutellum are usually obsolete, as in Guérin's description.

Philanthus nigrohirtus, sp. n.

♀. Nigra, mandibulis macula basali, clypeo, facie, macula parva pone oculos, vertice macula obliqua utrinque oculos attingente, pronoto margine postico, tegulis, callis humeralibus macula parva, mesopleuris antice, scutello, postscutello, femoribus anticis intus, tibiisque supra flavis: abdomine fulvo-flavidulo, segmento primo basi nigro; fronte inter antennas dense nigro-hirsuto; alis fuscis.

♂. Feminæ similis; fronte supra antennis bimaculata (sæpe transverse fasciata), vertice immaculato, scutello postscutelloque nigris, nonnunquam flavo-maculatis, clypeo apice macula minuta nigra.

Long., ♀ 12 mm., ♂ 10 mm.

♀. Clypeus very broadly rounded at the apex, very sparsely punctured, with a long black hair springing from each puncture; front very closely and finely punctured, with delicate longitudinal striæ, and rather thickly clothed with long black hairs, which are especially dense between the antennæ; vertex shining, rather closely punctured; the

ocelli in an almost equilateral triangle, the posterior pair almost as far from each other as from the eyes. Antennæ stout, the second joint of the flagellum not as long as the third and fourth combined, the fourth as broad as long. Pronotum smooth; mesonotum shining, closely punctured, more closely anteriorly than posteriorly, clothed with black hairs; scutellum and postscutellum almost smooth, pleuræ closely punctured. Median segment closely and finely punctured, the sulci defining the basal area almost obsolete, a broad longitudinal depression on the middle of the dorsal surface not quite extending to the base. Abdomen smooth and shining, sixth tergite delicately longitudinally striated; sternites sparsely punctured. Fore metatarsus with seven spines. Cubitus of the hind wing originating distinctly beyond the transverse median nervure.

♂. The sculpture throughout rather stronger than in the female, scutellum sparsely punctured, median segment finely punctured-rugose; tergites smooth and shining, the seventh tergite with large scattered punctures. Fourth joint of the flagellum distinctly longer than broad. Distance between the eyes on the vertex about equal to the length of flagellar joints 2–4.

Hab. Mt. Kokanjero, S.W. of Elgon, Uganda Protectorate, 6400 ft. (*S. A. Neave*), August 1911; Ruwenzori, 7000–8000 ft. (*Scott Elliot*).

Males with the black pubescence somewhat shorter are in the collection from Ankole-Toro Border, E. of Lake George (*S. A. Neave*), October 1911; Nandi Escarpment, 5800 ft. (*S. A. Neave*), May 1911; and Uchwezi Forest, British E. Africa (*S. A. Neave*), March 1912.

Philanthus nigrohirtus, subsp. *calvus*, subsp. n.

Specimens of both sexes from the Luangwa Valley, N.E. Rhodesia, are without the long black hairs on the head and thorax, but do not differ appreciably otherwise. For this form I suggest the above subspecific name. The female is without yellow marks on the vertex. This approaches *P. stecki*, Schulz, but the eyes are a little further apart on the vertex, the posterior ocelli in *stecki* being distinctly nearer to the eyes than to each other. Specimens apparently not distinct specifically from *calvus* from W. Africa (Gambia, Gold Coast, Togo, and N. Nigeria) often have eight spines on the fore metatarsus. These seem to be distinct from *P. camerunensis*, Tullgr., in which the posterior

ocelli are much further from the eyes than from each other and the clypeus more narrowly rounded.

Philanthus loeflingii, Dahlb.

Philanthus loeflingii, Dahlb. Hymen. Europ. i. p. 495 (1845). ♀.
Philanthus innominatus, Bingh. Ann. & Mag. Hist. (8) x. p. 212 (1902).

Hab. The whole Ethiopian region from Harar and the Gambia to Natal.

Philanthus triangulum, Fabr.

Vespa triangulum, Fabr. Entom. Syst. p. 373 (1775).
Crabro diadema, Fabr. Spec. Intect. i. p. 471 (1781).
Philanthus frontalis, Gerst. Monatsber. Akad. Wiss. Berlin, p. 509 (1857).

Hab. The whole Ethiopian region.

Philanthus histrio, Fabr.

Philanthus histrio, Fabr. Syst. Piez. p. 301 (1804).
Philanthus formosus, Sm. Cat. Hym. B.M. iv. p. 471 (1856). ♂.
Philanthus flavolineatus, Cameron, Speedelt, Kilimandjaro-Meru Exp., Zool. ii. p. 271 (1910).
Philanthus trichocephalus, Cam. Ann. Transvaal Mus. ii. p. 146 (1910).

Hab. E. Africa from Harar to Natal; Angola.

Philanthus ugandicus, Magr.

Philanthus ugandicus, Magr. Bull. Mus. Hist. Nat. Paris, xiv. p. 188 (1908). ♀.
Philanthus pilifrons, Cameron, Speedelt, Kilimandjaro-Meru Exp., Zool. ii. p. 271 (1910). ♂.

Hab. E. Africa, Transvaal to Harar.

I think that these, although differing much in colour, are only sexes of one species; but in specimens from Mombasa the males are coloured as the females, with the abdomen wholly testaceous red on the second and third tergites and a yellow spot on each side of the first tergite, the fourth and fifth tergites are marked with black at the base. This appears to be the usual colouring of the species from Harar to Johannesburg. I have seen no females with the colouring of *P. pilifrons*, but several males from the Naudi plateau and Usanga. *Philanthus limatus*, Bingh., is allied to this species, but not identical.

Philanthus strigulosus, sp. n.

♀. Nigra; clypeo, facie, macula curvata inter antennas, fascia transversa frontali, orbitis externis anguste tegulisque flavis; tergitis primo macula magna utrinque, secundo, apice excepto, tertioque lateribus fulvo-ferrugineis; tergitis quarto quintoque lateribus anguste, sternitis 2–5, basi nigris, femoribus posticis apice, anticis intermediisque fere totis, tibiis tarsisque flavo-testaceis; alis flavo-hyalinis, apice leviter infuscatis, venis fulvis.

♂. Feminæ similis; fascia frontali latissima; tergito quarto etiam fulvo-ferrugineo, apice in medio nigro, sexto lateribus flavo-maculato.

Long., ♀ 18 mm., ♂ 17 mm.

♀. Clypeus broadly rounded anteriorly, sparsely and shallowly punctured; front between the antennæ convex, very finely and closely punctured, the front above the antennæ very finely and closely longitudinally striated, punctured between the striæ; vertex shining, coarsely, but not closely punctured; ocelli in a broad triangle, the posterior pair a little further from the eyes than from each other; pubescence dark fulvous on the front, black on the vertex and thorax; second joint of the flagellum as long as the third and fourth combined, each of the two latter a little longer than broad. Pronotum closely punctured; mesonotum closely and strongly punctured anteriorly, much more sparsely in the middle and at the apex; scutellum shining, coarsely but sparsely punctured; postscutellum more closely punctured. Triangular area of the median segment very coarsely obliquely striate-rugose, margined by a very broad smooth and shining space; the sides and apex of the segment very closely, but not coarsely, punctured rugulose. Tergites rather sparsely punctured; the sixth tergite very delicately longitudinally striolate towards the apex; sternites with very sparse large punctures. Basal joint of the fore tarsi with eight spines on the outer margin. Cubitus of the hind wing originating a little beyond the transverse median nervure.

♂. Clypeus, face, vertex, mesonotum, and scutellum much more closely punctured than in the female. A bunch of long black hairs springing from just above the base of the mandibles on each side and reaching more than halfway to the middle of the margin of the clypeus. The two basal tergites more closely punctured than the others; seventh tergite coarsely but sparsely punctured.

Hab. Near Johannesburg, Transvaal (*A. J. Cholmley*);

Basutoland, between Matsekuwa and Mafeteng (*R. Crawshay*), March 30, 1902.

In the sculpture this approaches *P. rugosus*, Kohl, which I have not seen, but is a larger species, very differently coloured. There are only seven spines on the fore tarsus of the female in *rugosus*, instead of eight, and the clypeus of the male *rugosus* is armed with three small teeth, which are absent in *strigulosus*. There is also no mention in Kohl's description of the tufts of long hairs near the base of the mandibles. The puncturation of the second and third tergites of the female is as close as on the first, though the punctures are smaller.

Cerceris bagandarum, sp. n.

♀. Nigra; capite ferrugineo, fascia lata frontali nigra; clypeo, facie, carina interantennali, tergitisque primo, basi nigro, secundoque flavis; pronoto, mesonoto lateribus anguste, tegulis, pleuris, scutello, postscutello, segmento mediano, tergito sexto basi, sternitis primo dimidio apicali, sextoque, pedibusque ferrugineis; coxis supra, femoribusque posticis supra nigris; alis flavo-hyalinis, apice late infuscatis, venis testaceis; clypeo apice porrecto; mesopleuris subtuberculatis; sternito secundo area elevata basali nulla.

♂. Feminæ similis; pleuris nigris, segmento mediano nigro-maculato; macula magna ferruginea utrinque, sternitis secundo, sexto septimoque, tergitisque sexto septimoque ferrugineis; tergitis tertio, quarto quintoque fascia angusta transversa angulis apicalibus flava; alis subhyalinis, haud flavescentibus; clypeo haud porrecto apice angustato et obtuse tridentato; mesopleuris haud tuberculatis.

Long. ♀ 16 mm., ♂ 11 mm.

♀. Mandibles with a large triangular tooth on the inner margin at about one-third from the apex. Clypeus gradually raised from near the base, strongly convex and porrect at the apex, but without a free lamina. Antennæ inserted about half as far again from the anterior ocellus as from the base of the clypeus; interantennal carina strong; second joint of flagellum about two and a half times as long as the first. Posterior ocelli nearly twice as far from the eyes as from each other and as far from the hind margin of the head as from the eyes. Clypeus and face subaquæ almost impunctate, front and vertex closely punctured-rugose; thorax and median segment more coarsely punctured-rugose; mesopleuræ with a small tubercle; triangular basal area of the median segment strongly and regularly

transversely striate, the striæ very feebly arched. Abdomen almost smooth, finely aciculate, the basal segment distinctly broader than long, with a few scattered punctures; sixth tergite strongly narrowed from the base to near the middle, thence narrowly produced with almost parallel sides and narrowly rounded at the apex. Sixth sternite deeply triangularly emarginate at the apex, with tufts of golden hairs springing from just beneath the apical angles, the sixth tergite margined laterally with golden hairs, springing from beneath the segment.

♂. Mandibles with a blunt ill-defined tooth near the middle of the inner margin; clypeus and front minutely punctured, sparsely clothed with short sericeous pubescence; the clypeus longer than broad, narrowed anteriorly, the apical margin with three obtuse teeth. Antennæ inserted nearly as far from the base of the clypeus as from the anterior ocellus; second joint of the flagellum twice as long as the first. First tergite broader than long; sixth sternite with an acute spine and a tuft of long golden hairs at the apical angles; seventh sternite shallowly emarginate at the apex; seventh tergite parallel-sided, truncate at the apex, half as long again as broad.

Hab Kafu River, near Hoima-Kampala Road, Uganda Protectorate, 3500 ft. (*S. A. Neave*), December 29–31, 1911, 2 ♀ ♀; Siroko River, near W. foot of Mt. Elgon, 3600 ft. Uganda Protectorate (*S. A. Neave*), Aug. 12–14, 1911, 1 ♂.

Very near *C. diodonta*, Schlett., though differing much in colour. The structural points in both sexes correspond closely, but the striation of the basal area of the median segment is more oblique in *diodonta* and the puncturation of the second tergite is quite distinct, not obsolete as in the present species; the second tergite is also broader in *diodonta*, being rather sharply broadened just behind the base.

Cerceris sodalis, sp. n.

♀ ♂. Very close to *C. bagandarum* and practically identical with that species in the structure, colour, and sculpture of the head, thorax, and median segment, the female, however, has the posterior margin of the pronotum and the postscutellum yellow. The colour of the abdomen is ferruginous in both sexes, the sternites at the base and the middle of the second tergite black; the first tergite with a narrow apical band, second very broadly at the sides and narrowly at the apex, tergites 3–5 in the female and 3–6 in the male rather

less broadly at the sides and narrowly at the apex yellow. The sixth tergite of the female is very narrow at the apex, more so than in *bagandarum*, and the second tergite is more distinctly punctured in both sexes than in that species, though less closely than in *diodonta*. The second tergite of the female is broader than in *bagandarum*, though scarcely as broad as in *diodonta*.

Hab. 30 miles from Magadi Junction, British E. Africa (*F. G. Hamilton*), May 1912; Marsabit, British E. Africa (*C. A. Neave*), October 1911; east shore of Victoria Nyanza, near Karungu (*S. A. Neave*), April 1911; Kibwezi, British E. Africa, 3000 ft. (*S. A. Neave*), April 1911.

It is quite possible that this and *bagandarum* may prove to be a subspecies of *diodonta*, but they are quite easily distinguished, and until large collections are available may conveniently stand as distinct species. *C. secerni*, Kohl, is also very near in structure.

Cerceris bicolor, Sm.

Cerceris bicolor, Sm. Cat. Hym. B.M. iv. p. 447, no. 52 (1856). ♀.
Cerceris fossor, Sm. Cat. Hym. B.M. iv. p. 447, no. 54 (1856). ♂.

Cerceris andersoni, sp. n.

♀. Nigra; mandibulis, apice excepto, flavo-, antennis apicalibus subtus infumatis, tegulis, segmento ani et ventre sexto, pedibus apice, coxis exceptis, ferrugineis; clypei lamina macula magna, cauda inter antennas ad clypei basin, facie lineis lata lunatisque utrinque, postscutello, tergitis primo, tertio, quarto quintoque fascia angusta apicali, sternitisque tertio macula transversa apicali utrinque flavis; alis subtilissime hyalinis, apice cellulaque radiali infuscatis, venis fuscis, stigmate testaceo; clypeo lamina perfecta libera; mesopleuris haud tuberculatis; sternito secundo ad basin elevata nulla.
Long. 10 mm.

♀. Clypeus with a porrect lamina, free from near the base, the lamina coarsely punctured at the sides, the apical margin very shallowly and broadly emarginate and nearly equal to the distance from the base of the clypeus to the apex of the lamina; the clypeus below the lamina smooth and shining, truncate at the apex. Antenna inserted about twice as far from the anterior ocellus as from the base of the clypeus, the second joint of the flagellum less than half as long again as the third. Inner orbits of the eyes almost parallel; posterior ocelli further from the eyes than from each other. Face sparsely punctured; head and thorax

very closely rugosely punctured, the postscutellum more sparsely punctured; pronotum about two-thirds as long as the scutellum. Median segment rugosely punctured; the basal area triangular, almost equilateral, obliquely striated, with a median longitudinal groove, the apex irregularly transversely striated. Tergites strongly but not closely punctured, first tergite broader at the apex than long; pygidial area rugulose, elongate, fully twice as long as its greatest breadth, and more than three times as long as its apical breadth, the apex subtruncate. Second sternite shining, sparsely punctured.

Hab. Eastern edge of forest of Aberdare Mountains, 7300 ft. (*T. J. Anderson*), February 1911.

This belongs to the group of the European *C. labiata*, and is rather closely related to that species, but is not very near any other Ethiopian species. The interantennal carina is less elevated than in *labiata*, and is flattened towards the base of the clypeus. Two females from Mlanje Plateau, Nyasaland, 6500 ft. (*S. A. Neave*), December 1913, have the postscutellum black and the lamina of the clypeus much reduced in size. These may represent a subspecies, but I cannot regard them as specifically distinct.

XLVI.—*A new Dicynodont from the Stormberg Beds of South Africa.* By S. H. Haughton, B.A., F.G.S., Assistant Director, South African Museum.

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Theodontosaurus minor, sp. n.

The specimens forming the type of this new form were presented to the South African Museum by the late Dr. M. Ricono. They consist of a left tibia, a cervical vertebra, and a portion of the left ilium.

Left Tibia.—The tibia is 109 mm. long. The proximal articular surface is 31 mm. long and 18 mm. broad. This surface for the most part slopes obliquely backwards and laterally, the inner border being convex from front to back and higher in front than behind. The tuberositas tibiæ is almost the highest point of the bone; it is prolonged anteriorly and turned slightly outwards. The lateral condyle is

strongly developed. Below the head the shaft thins rapidly until at its middle it has an antero-posterior thickness of 12 mm. and a width of 10 mm. Thence it thickens towards the distal end. The anterior face is flat, with a prominent edge on the lateral side and a rounded edge medially. The outer sharp edge is continued down to the anterior distal process. The posterior border of the shaft is rounded.

The distal surface is trapezoidal in form. The inner anterior border is 20·5 mm. long, the posterior outer border 16 mm. long, while the posterior inner border is 12 mm. long. The anterior process lies 7 mm. above the posterior process. Between the two on the outer surface of the bone is a shallow groove.

Cervical Vertebra.—The length of the body is 31 mm. The anterior articular surface is slightly larger than the posterior. Both are considerably higher than broad. The body is pronouncedly amphicœlous. There is a prominent median ventral keel, sharper in its anterior half. The whole body is strongly compressed laterally, having a width at the middle of 5 mm. and at the anterior end of 8 mm. The canal has a height and breadth anteriorly each of 5 mm. The ends of the zygapophyses are missing. The dorsal spine was low and fairly long, with a somewhat convex upper border.

Ischium.—A portion of what is probably the left ischium is preserved, including the proximal articular surface. The bone is bent strongly backwards, more so than in *Pæcilopleuron eucus antiquus* as figured by von Huene, so that the ischium must have been directed very strongly backwards. At the broken distal end the bone is 12 mm. thick and 6·5 mm. broad. The inner border of the proximal surface is straight, the lateral border has a prominent outward projection, the maximum width of the surface being 9 mm.

The nature of the tibia and the ischium mark these remains off from the Plateosauridæ, and place them among the Thecodontosauridæ. They indicate a member of this family smaller than any hitherto described from South Africa, and which cannot be exactly identified with any European species. I propose, therefore, to give it a new specific name, *Thecodontosaurus minor*.

Type. S.A.M. Cat. no. 3451.

Locality. Pitsing, Maclear, C.P. Cutting in road to Naude's Nek.

Horizon. Red Beds, just below halfway from base.

XLVII.—*Notes on Myriapoda.*—XIV. *The Re-discovery of* Cylindroiulus parisiorum (*Brölemann et Verhoeff*). By Hilda K. Brade-Birks, M.Sc., M.B., Ch.B., L.R.C.P., M.R.C.S., and the Rev. S. Graham Brade-Birks, M.Sc.

We hope to deal before very long with some centipede and millipede material from the English Midlands, but we think the present brief note advisable, owing to the exceptional interest of the species it records.

Mr. S. Priest, F.G.S., with Mr. and Mrs. F. J. Epps (all members of the Dartford Naturalists' Field Club) visited Upper Arley, Worcestershire, on 22. vii. 1918, and took a number of millipedes and centipedes between the bark and trunk of fallen timber in a meadow next to the churchyard there. This material, which was kindly submitted to us by the collectors, included a species of *Julus* (s. l.), which upon dissection we found to be referable to *Cylindroiulus parisiorum* (Brölemann et Verhoeff, 1896).

Anterior and posterior gonopods in profile. × 100. H. K. B.-B. del.

We sent our drawing of the gonopods to M. le Dr. Henry W. Brölemann, who agrees with our diagnosis, and informs us, *in litt.*, that nobody appears to have identified the species since its first description (1). Thus some doubt had arisen in Dr. Brölemann's mind as to the validity of the species. The English re-discovery of the animal is therefore of some importance.

Externally *C. parisiorum* is practically indistinguishable

from *C. britannicus*, Verhoeff, and *C. frisius* Verhoeff, both of which are not uncommon English species. However, the gonopods, which are figured by Bölemann and Verhoeff (*loc. cit.*), are quite definite diagnostic characters, and so there is no doubt about the record. Our material bears these numbers :—1379, 1380, 1381, 1382, Brade-Birks collection.

Reference.

(1) Bröleмann, H. W., and C. W. Verhoeff. "Matériaux pour servir à une faune des Myriapodes de France." Feuille des Jeunes Naturalistes, Sept. 1896, no. 311, pp. 214 *et seq.*, with 10 text-figs.

XLVIII.—*Note on the Pectoral Fin of* Eusthenopteron. By Dr. Branislav Petronievics.

The pectoral fin of *Eusthenopteron* was figured and described for the first time by Whiteaves (comp. J. F. Whiteaves, 1889, p. 87, & pl. v. fig. 5), whose description was improved by Traquair (comp. R. H. Traquair, 1890, p. 194). Two other specimens of the same fin were figured by A. S. Woodward (1898, p. 25) and W. Patten (1912, p. 391).

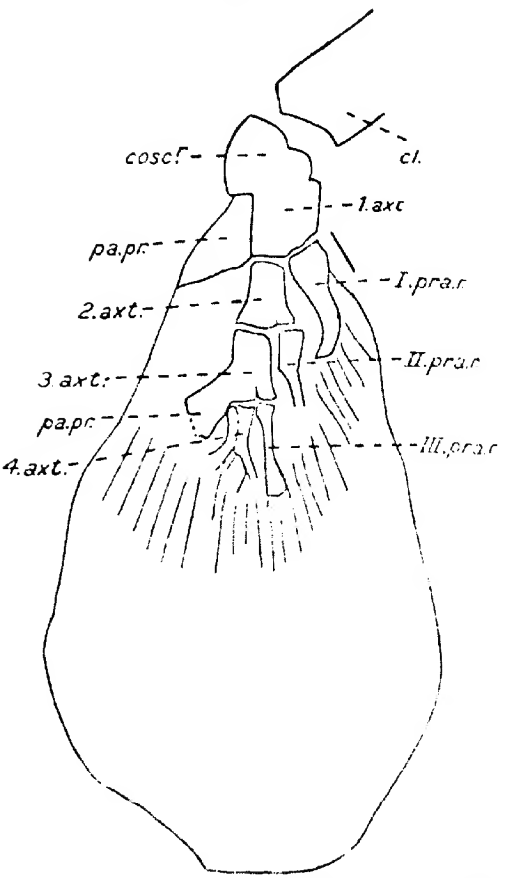
During my stay in London this year the pectoral fin in the British Museum specimen P. 6795 of *Eusthenopteron*, figured by A. S. Woodward (whose figure was republished by E. S. Goodrich in 1902, pl. xvi. fig. 1), was somewhat newly prepared by Mr. F. O. Barlow. I give here a new figure of it (comp. text-fig. 1) and a brief description.

The pectoral fin in our specimen is composed (1) of an axis, (2) of preaxial radials, and (3) of postaxial processes.

The axis consists of four pieces. The first or basal piece is situated behind the displaced cleithrum, of which the inferior edge lies near to its superior edge in the specimen. It is not possible to decide whether this elongated and somewhat obscure bony matter is to be identified wholly with the basal piece of the fin, or whether it does not comprise also the coraco-scapular ossification. Should this latter be the case, then the front edge of the postradial process of the basal would mark the limit between the basal and coraco-scapula.

The second piece of the axis is expanded and slightly bifurcated posteriorly. The third piece is somewhat longer than the second and expanded still more posteriorly, where it has not only a large postaxial process, but is also more distinctly bifurcated.

Fig. 1.



Pectoral fin of *Eusthenopteron*, British Museum specimen P. 6206. Nat. size.

cl, cleithrum; *cosc*, the possible coraco-scapula; *1.axt.*, the first axonost or the basal, *2.axt.*, second axonost; *3.axt.*, third axonost; *4.axt.*, fourth axonost; *I.pra.r.*, first preaxial radial; *II.pra.r.*, second preaxial radial; *III.pra.r.*, third preaxial radial; *pa.pr.*, postaxial process; dermal rays are represented by lines.

Finally, the fourth piece of the axis is somewhat constricted in the middle, and quite distinctly bifurcated posteriorly (a feature not marked in the figure of A. S. Woodward, 1898). When looked at with a magnifying-glass, these two posterior branches seem to continue in two separate ossifications, so that the composition of this fourth axonost of two separate parts is not improbable, although not to be affirmed with certainty, the separating line between the two being perhaps due to a crack. One sees also with the magnifying-glass the clear attachment of a dermal ray to the left of these two bifurcations, while a fragment of somewhat crushed bony matter attached to the right bifurcation also probably represents dermal rays.

There are three preaxial radials in our specimen. The uppermost radial is attached to one of the two articulating surfaces of the basal axonost; it is bent inwards in the middle and constricted posteriorly. The new preparation shows the attachment of the dermal rays to this radial very clearly. The second radial, attached to the smaller of the two articulating surfaces of the second axonost, is also constricted posteriorly, but not sufficiently preserved in its posterior part. The third radial, better preserved than the second, is constricted in the middle, but the limit of its posterior part is indeterminable. It is attached to the smaller of the two articulating bifurcations of the third axonost.

There are only two postaxial processes in our specimen, and no postaxial radials at all. The first process is a large prolongation of the basal axonost (this prolongation is not well visible in the figure of A. S. Woodward, 1898), and the second a prolongation of the third axonost, while the second and the fourth axonosts are devoid of similar processes (on the left side of the second axonost some bony matter is visible in our specimen, but it is evidently a crushed scale).

Having finished the description of the fin in question, I will add some remarks concerning the problem of the origin of the tetrapod limb. The resemblance of the internal skeleton of the pectoral (and also of the pelvic) fin in *Eusthenopteron* to the internal skeleton in the tetrapod limb has been emphasized by several authors (by Patten, Watson, Broom, Gregory, and Watson especially has tried to point out in detail the homologies of both (comp. Watson, 1913, p. 25 *s. q.* and figs. 1 & 2). But his restoration of the pectoral fin of *Eusthenopteron* (*l. c.* fig. 2) is wrong, inasmuch as he takes no account of the posterior bifurcation of the fourth axonost (in this respect the restoration of Broom, 1913, p. 460, fig. 1, is more accurate) and represents the postaxial process of the

basal axonost as a separate postaxial radial (in this respect the restoration of Broom is exact).

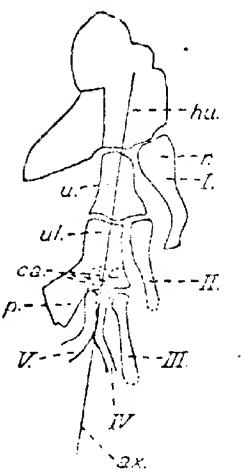
Now I consider the posterior bifurcation of the fourth axonost in our specimen as of exceptional importance for the question of homologies. As the pelvic fin of *Eusthenopteron* is far more reduced than its pectoral fin (comp. fig. 1 of pl. xvi. in Goodrich, 1902, which shows that there is no fourth axonost in the pelvic fin—British Museum specimen P. 6794—and no postaxial processes), we must infer that the paired fins of *Eusthenopteron* represent a stage far in advance of that stage of the paired fins in its ancestors, which was the starting-point for the evolution of the paired limbs in the primitive ancestors of the Tetrapoda*. If this inference is a right one, then it is not improbable that the posterior bifurcation of the fourth axonost in our specimen is a remnant of a more primitive stage when the fourth axonost was composed of two separate ossifications, the paired fins of *Eusthenopteron* being evidently the reduced archipterygium-type of Gegenbaur (a resemblance recognized by Woodward, Traquair, and others). So that we have to conclude from this evolution that the axis of the tetrapod limb runs along the humerus, ulna, ulnare, and between the fourth and fifth finger† (comp. text-fig. 2, in which some further hypothetical homologies have been indicated). This conclusion, as one sees,

* This conclusion is confirmed also by the skull, which in *Eusthenopteron* is simpler than in the more primitive Osteolepidæ, whose paired fins are also less reduced (comp. the fins of *Megalichthys* figured by Ed. D. Wellburn in his paper "On the Genus *Megalichthys*," in Proc. Yorkshire Geol. & Polytechnic Soc. vol. xiv., 1900). I may add in this connexion that the skull of *Osteolepis* may be considered to approach nearer to the Stegocephalian skull than is shown by the restoration of Pander (comp. Chr. H. Pander, 'Ueber die Saurodipterinen, &c.,' 1860, pl. i. figs. 8 & 9), lately reproduced by Gregory (comp. Gregory, 1915, fig. 2, A, B). Pander's restoration was founded on the specimen of *Osteolepis microlepidotus* figured by him in pl. i. fig. 1; but fig. 4 on the same plate represents a specimen in which all the three characteristic bones of the Stegocephalian skull (supratemporal, intertemporal, postorbital) are present.

† The pectoral fin of *Sauripterus taylori* figured and restored by Gregory, 1915, plate iv. and fig. 9, does not militate against this supposition. This fin, less reduced than that of *Eusthenopteron*, has three elements attached to the third axonost, so that these three elements may correspond with the three digits on the ulnar side of the tetrapod limb. As the two outer of these three elements have almost the same length, it may well be supposed that the axis runs between the two (and not along the outer one alone, as Gregory hypothetically supposes—comp. Gregory, 1915, p. 330). I should mention that the first to emphasize the resemblance of the *Sauripterus*-fin with the tetrapod limb was its discoverer, James Hall himself (comp. J. Hall, 'Geology of New York,' part iv. 1843, p. 282).

does not entirely confirm the theory of Gegenbaur, according to which the tetrapod limb is derived from a reduced uniserial archipterygium (comp. Gegenbaur, 1898, p. 520), but nevertheless it is more in conformity with this theory than with the other (also advocated by Watson), which takes a reduced biserial archipterygium for the base of the tetrapod limb.

Fig. 2.



The internal skeleton of the Pectoral Fin of *Eusthenopteron*, showing homologies with the tetrapod limb. Nat. size.

hu., humerus; *u.*, ulna; *r.*, radius; *ul.*, ulnare; *p.*, pisiform; *ca.*, three distal carpalia; *I.*–*V.*, digits; *ax.*, axis of the tetrapod limb.

In conclusion, I desire to express my thanks to Dr. Smith Woodward for the loan of the new preparation and for valuable help.

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XLIX.—*Descriptions and Records of Bees.*—LXXXII.

By T. D. A. Cockerell, University of Colorado.

Exomalopsis mellipes, Cresson.

The male, not before known, has been collected by H. H. Hyde at Medellin, Vera Cruz, Mexico (Baker coll., 1785). It runs in Friese's table of males to *E. planiceps*, Sm., but is larger, with red legs.

Exomalopsis vincentana, Cockerell.

The male, previously unknown, was collected by H. H. Smith on the windward side of St. Vincent. It is hardly 5 mm. long, and there is much black hair on mesothorax, scutellum, and legs. It is nearest to *E. globosa*, but distinguished at once by the ochreous-yellow tarsi.

There is a series of small *Exomalopsis* (including *Labiophorula*), which are superficially similar and easily confused. They may be separated by the following table, based on females:—

Second abdominal segment with oblique stripes of light hair at sides, but no apical band ..... 1.

	Second abdominal segment with an apical hair-band	3.
1.	Disc of scutellum with black hair	*globosa* (Fabr.).
	Disc of scutellum with fulvous hair	2.
2.	Basitarsus with much black hair	*pulchella*, Cresson.
	Basitarsus with pale hair	*similis*, Cresson.
3.	Second segment of abdomen with a narrow apical band of snow-white hair	*cerbesinæ*, Ckll.
	Second segment with a broad band	4.
4.	Abdominal hair-bands clear white; eyes green	*chlorina*, sp. n.
	Abdominal bands greyish or yellowish; eyes not green	5.
5.	Hind legs with much black hair	6.
	Hind legs with hair mainly or nearly all pale; species of *Anthophorula*	7.
6.	Flagellum ferruginous beneath, abdomen broader	*nitens*, Ckll.
	Flagellum dark coffee-brown beneath	*albovittata*, sp. n.
7.	Tegulæ rufo-testaceous; stigma larger, pale amber	*texana*, Friese.
	Tegulæ dark; stigma smaller	8.
8.	Disc of mesothorax polished and smooth	*coquilletti*, Ashmead.
	Disc of mesothorax punctured	*morgani*, Ckll.

Exomalopsis albovittata, sp. n.

♀.—Length nearly 7 mm.

Closely allied to the Californian *E. nitens*, but less robust; flagellum dark; hair of face pure white; disc of mesothorax with fine but distinct punctures; hair of scutellum shorter and greyish instead of yellowish; hair on base of first abdominal segment pure white, apex of first segment with only a rather small patch of white hair on each side. The loose scopa of hind tibiæ and tarsi is black behind (above) and white in front; the wings are dusky, and the tegulæ are piceous.

Oaxaca, Mexico (*Crawford*). U.S. Nat. Museum.

There is some resemblance to *Leptergatis globulifera*, but the front is smooth and shining in the *Exomalopsis*, densely punctured in the *Leptergatis*.

Exomalopsis chlorina, sp. n.

♀.—Length about 6 mm.

Eyes bluish green; hair at sides of face dense and pure white; flagellum red beneath, dark above; hair of thorax white; tegulæ rufo-piceous; wings clear, stigma and nervures pale amber; stigma much smaller than in *E. texana*; bands on abdominal segments 2–5 broad and pure white; scopa of hind legs on outer side white, blackish at base of tibia.

dark fuscous on inner side of basitarsi; mesothorax very distinctly punctured; tarsi red at apex.

Las Cruces, New Mexico, at flowers of *Sphæralcea* in garden of my house, Aug. 24 (*Cockerell*).

I had confused this with *E. texana*, but, having received a topotype of the latter, I find it is quite distinct.

Exomalopsis thermalis, sp. n.

♀.—Length about 9 mm.

Very robust, black; hair of head and thorax long and white, with a slight creamy tint; head very broad; eyes olive-green; labrum black; mandibles chestnut-red in middle; clypeus flattened, shining, sparsely punctured; flagellum chestnut-red beneath; mesothorax closely and strongly punctured; scutellum shining, with very fine punctures; tegulæ bright rufo-fulvous. Wings yellowish, the large stigma and the nervures clear ferruginous; small joints of tarsi red; hair on inner side of tarsi ferruginous; middle tibiæ with short fuscous hair on outer side beyond middle; middle basitarsi with long white hair on outer side; scopa of hind legs long and plumose, largely black on outer side, that on basitarsus of three colours—black, white, and red. Abdomen very broad, with a glaucous tint; first two segments closely punctured as far as the narrow arched pale hair-band, beyond that smooth and shining, the second segment with excessively minute punctures; segments 3 to 5 with broad bands of yellowish tomentum, the fifth broadly fringed with fuscous hair apically.

Agricultural Entes, Mexico, Dec. 1, 1909 (*F. C. Bishopp*). U.S. Nat. Museum.

Exomalopsis crucis, sp. n.

♀.—Length about 8.5 mm.

Closely allied to the last, differing thus: scape more or less reddish, especially at base; flagellum pale ferruginous beneath; labrum clear red, with pale reddish hair; hair of thorax above strongly tinged with yellowish; scutellum closely and very distinctly punctured; first abdominal segment reddish basally.

Medellin, Vera Cruz, Mexico (*H. H. Hyde*; Baker coll., 1785). U.S. Nat. Museum.

These two species are related to *E. mellipes*, Cress. (which has red legs); and more especially to *E. frederici*, Ckll., which has the tarsi, and tibiæ at apex, ferruginous—at

least, in the male (female unknown). I questioned whether *E. thermalis* might be the female of *frederici*, but the fine short pile on basal part of third abdominal segment in *thermalis* is pale greyish ochreous, in *frederici* it is black. The hind spurs of *thermalis* and *crucis* are strongly curved at end, as in *frederici*. A second specimen of *E. crucis* comes from San Juan Allende, Mexico, Nov. 29 (*C. H. T. Townsend*).

Leptergatis globulifera, Cockerell.

The female, not before known, was taken by M. A. Carriker at Aroa, Venezuela, Dec. 12, 1910. It is much like *L. armata*, Sm., but has redder antennæ. From the female alone, I should have regarded the insect as a local race of *armata*.

Tetrapedia diversipes, Klug.

Manaos, Brazil (*Miss H. B. Morrell*); San Bernardino, Paraguay (*K. Fiebrig*).

Nomada callioptera, sp. n.

♂.—Length about 10·5 mm.; expanse about 18·5.

Head and thorax black, densely punctured, with long and abundant pale fulvous hair; lower corners of face broadly with a sharply pointed extension upward along orbit, broad band along lower margin of clypeus, base of the simple mandibles, labrum (which is not dentate) and the rather stout scape in front, all yellow; eyes pale grey; flagellum thick, simple, black above (except the sutures), ferruginous beneath; third antennal joint brighter red, about half as long as fourth; scutellum lighter, very coarsely punctured; tubercles red and polished, but no other light marks on thorax; tegulæ red. Wings clear, the apex fuscous; stigma clear bright ferruginous, nervures fuscous; b.n. going a short distance basad of t.-m.; first and second t.c. nervures convex outwardly. Legs red, anterior tibiæ with an apical yellow spot; middle trochanters black above, with a red spot, and highly polished; middle femora black beneath basally; hind femora black behind except at apex. Abdomen red with rather pale yellow markings, hind margins of first three segments broadly fuscous, first segment with more than basal half black, and small yellow marks sublaterally; second segment black at base, and with a very large yellow patch (not pointed mesad) on each side; third

with a very broadly interrupted yellow band, excavated behind sublaterally; fourth to sixth with yellow bands, interrupted by a red spot on each side; apical plate broad, notched; venter red with yellow bands.

Tokyo, Japan, April 12, 1909 (*Sasaki*). U.S. Nat. Museum. It is also labelled Yamada.

In the table of Palæarctic species it runs near *N. manni*, Moraw., differing by the black scutellum. It is quite distinct from all those described from Japan. It is a large species of *Nomada*, s. str.

Nomada pyrifera, sp. n.

♀.—Length about 10 mm.

Head and thorax red with black markings, closely punctured, the hair white; labrum pale yellow, with no distinct tooth; malar space pale yellowish; mandibles simple, red, black at apex; lower part of clypeus, and lower part of supraclypeal area, suffusedly yellowish; middle of front, extending to occiput, black, and cheeks black with a broad red band behind eyes; antennæ entirely red, long, reaching to base of abdomen; third joint scarcely half as long as fourth (this at once separates it from the superficially similar *N. japonica*, Sm.); mesothorax with three black bands, confluent in front; scutellum strongly elevated, entirely red; area of metathorax black in middle and red sublaterally; pleura nearly all red; no yellow on thorax; tegulæ pale red. Wings clear, dilute fuscous at apex; stigma ferruginous; nervures fuscous; b. n. going far basad of t.-m.; second s.m. very broad, receiving first r. n. about middle. Legs bright ferruginous, hind femora with a black stripe behind. Abdomen smooth and polished, ferruginous; basal half of first segment black, second segment with a very large pyriform (pointed mesad) spot on each side; fourth and fifth segments with yellow bands, failing laterally; venter with broad yellow bands.

Japan (presumably Tokyo), May (*Sasaki*). U.S. Nat. Museum.

This also runs near *N. manni* in the Palæarctic fauna, but is readily distinguished by the pattern of abdomen and the red scutellum. Sasaki collected two males, of different species, which looked like *N. pyrifera*. One I have described as *N. calloptera*, as it differs from *pyrifera* in the colour of the stigma and the basal nervure going less basad; the other, collected at Tokyo in April, I suppose to be the true male of *pyrifera*. It is unfortunately in very bad condition, but

the following characters can be made out: mandibles largely yellow; face densely covered with white hair; scape swollen, yellow in front; mesothorax all black; tubercles yellow; scutellum with yellowish or reddish spots; metathorax and pleura all black; venation and colour of stigma as in *pyrifera*; first abdominal segment with basal half black, apical half red, and two large yellow spots, not far apart, on the red; second segment with pyriform marks larger, meeting in the middle line; segments 3 to 6 with entire yellow bands; apical plate feebly notched; venter with yellow bands.

Andrena melanospila, sp. n.

♀.—Length 10 mm.

Black, the head and thorax with copious moderately long hair, dull white on face, cheeks, and pleura, pale fulvous on occiput and dorsum of thorax (brightest on scutellum), but black on mesothorax posteriorly, and on front and vertex; malar space linear; process of labrum rather narrow, obtuse; clypeus brightly polished, with sparse small punctures; facial foveæ broad, dark brown, not extending below level of antennæ; antennæ dark; third joint much longer than fourth, but not quite as long as fourth and fifth; mesothorax dull and granular, shining posteriorly; scutellum shining, without evident punctures; area of metathorax dull and finely granular; tegulæ piceous. Wings dusky, the large stigma and nervures dull reddish; b. n. meeting t.-m.; second s.m. receiving first r. n. distinctly beyond middle; scopa of hind tibiæ white in front and black behind. Abdomen dull, not punctured; second segment depressed scarcely a fourth; hind margins of segments 2 to 4 with narrow pure white hair-bands; caudal fimbria purplish black.

Soochow, China (*N. Gist Gee*). U.S. Nat. Museum.

In the Palæarctic fauna this falls near to *A. denticulata* (Kirby), from which it is easily separated by the narrow white abdominal bands and the black and white hair of hind tibiæ. It is not like any of the species described by Strand from Tsingtau. The abdominal bands are as in *A. wilkella*, but that has an entirely different clypeus.

Andrena delicatula, sp. n.

♂.—Length 8 mm.

Black, superficially exactly like *A. albicrus*, but running in tables of Palæarctic species to *A. lapponica*, which is a

larger insect. Hair of head and thorax long and white, very faintly yellowish on scutellum, a little blackish hair at sides of face; mandibles long and curved; process of labrum weakly bilobed; clypeus dull, covered with long white hair; antennæ entirely dark; third joint about equal to fourth; mesothorax and area of metathorax dull and granular; tegulæ piceous, reddish posteriorly. Wings slightly dusky; the large stigma and nervures dull ferruginous; b. n. falling some distance short of t.-m.; second s.m. broad, receiving first r. n. at middle. Legs black, tarsi reddish at apex. Abdomen shining, not punctured, segments 2 to 4 with thin white hair-bands at sides only; apex emarginate.

Soochow, China (*N. Gist Gee*, 121). U.S. Nat. Museum.

The abdomen has little of the long loose hair so conspicuous in *A. albicrus*. Among the Japanese species, this falls nearest to *A. præcociformis*, Ckll., which is larger, with shining clypeus and chestnut-red stigma. The cheeks are broader and flatter in *A. delicatula*. From Soochow also comes *Nomia chalybeata*, Smith (*N. Gist Gee*, 140).

Agapostemon cockerelli, Crawford.

Longmont, Colorado, Sept. 7, 1918 (*Cockerell*). New to Colorado.

Colletes sieversi, Cockerell.

Gregory Canyon, Boulder, Colorado, July 13 (*Cockerell*).

Trigona ruficrus corvina, Cockerell.

Chagres River, Panama Canal Zone, Oct. 9, 1917, "chewing on the leaves of young citrus plants" (*Harold Morrison*).

L.—*A new Species of* Eligmodontia *from Catamarca.*

By OLDFIELD THOMAS.

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THE British Museum has recently received a small collection of mammals from Chumbicha, Catamarca, collected by Sr. E. Budin, and among them there occur specimens of the following new species:—

Eligmodontia marica, sp. n.

Size smaller than in other species. Fur soft and fine, hairs of back about 7 mm. in length. General colour above pale sandy buff, darker along the back, paler on the sides where it is nearly "pinkish buff." Whole of under surface pure sharply defined white, all the hairs, even laterally, white to their bases. Middle of face and crown darker buffy like the back, area between eyes and ears, and a patch above each eye paler like the sides. Ears large, the usual piebald arrangement of their colour strongly marked; a whitish patch at base of proctotæ, middle part of proctotæ nearly black, terminal part and whole of metatotæ greyish buffy, the fine hairs along the edge white. Limbs wholly white, the buffy body-colour not or scarcely encroaching on the white of the inner arms; palms and soles with the structure characteristic of *Eligmodontia*, but the hairy covering quite thinly spread. Tail longer than head and body, cuil buffy above, whitish below, the contrast not so marked as it is in the southern species.

Skull markedly smaller than that of the other species, especially as compared with that of the forms geographically nearest.

Dimensions of the type (measured in the flesh):—

Head and body 65 mm.; tail 93; hind foot 20; ear 15.

Skull: greatest length 21·4; zygomatic breadth 12; nasals 8; interorbital breadth 3·8; breadth of brain-case 11; palatar length 9·3; palatal foramina 1·8; upper molar series 3·5.

Hab. Chumbicha, Catamarca. Alt. 600 m.

Type. Young adult male. B.M. no. 18.11.11.1. Original number 311. Collected 30th July, 1918. Presented by Oldfield Thomas.

This beautiful little mouse is the smallest species of the genus and is readily distinguishable by size from *E. hirtipes* and *morceni*, occurring north and south of it respectively. *E. typus*, with which the Bahia Blanca *elegans* is always assumed to be synonymous, is also larger, and the belly-hairs are broadly slaty at base. The more southern *E. morgani* has a proportionally shorter tail.

Mr. Baden says of *E. marica*:—"This pretty mouse has been the one which has most pleased and interested me of all the rodents. It was caught among the prickly pears ['pencas'] in one place only, in a space some 40 square

metres in area, where I obtained four specimens, but saw none anywhere else, and it is evidently very rare."

[As an indication of the extent to which our British National Museum has participated in the general advance in the systematic knowledge of Mammalia, and the corresponding accumulation of typical specimens, I may perhaps be permitted to record that, so far as I am able to calculate, this is the two-thousandth mammal to which, as the official mammalogist of the Museum, I have had occasion to give a name. And many hundreds more have been described and named by other workers. The vastness of the collection—especially of types—indicated by these figures is due mainly to the patriotism of our countrymen all over the world, many of whom have been proud and pleased to contribute to their National Museum merely because it is the National Museum, without pay or return, and often in climates where mere existence is a burden.

Having possessed for forty years the great privilege of working on this wonderful collection, I feel I cannot too strongly express my appreciation of the generosity and public spirit shown by its many contributors—whether those who at home have provided funds for making expeditions, or abroad have made collections to be added to the National treasures.

My own share in the work, carried on as it has been under the most favourable conditions, has been a continuous pleasure. And in appreciation of one important element in this pleasure, the sympathetic and ever-ready help of my wife, I have given to this attractive little animal the above specific name.]

LI.—*Two new Forms of* Leggada.

By Oldfield Thomas.

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Leggada bella sybilla, subsp. n.

Near *L. b. induta*, but with much shorter fur.

Hairs of back about 4·0–4·5 mm. in length. General colour buffy, not so bright as in *induta*, and broadly darkened on the back, the flanks clear buffy. Belly pure sharply defined white. A very small subanal white spot. Hands and feet white. Tail pale greyish above, white below.

Skull about as in *induta*, smaller than in *minutoides*, slightly larger than in *marica*. Posterior nares of normal shape.

Dimensions of the type:—

Head and body 55 mm.; tail 46; hind foot 13.

Skull: greatest length 18; condylo-incisive length 16·3; nasals 6·8; breadth of brain-case 8·5; palatal foramina 4; upper molar series 3·0.

Hab. Benguella, Angola. Type from the Usolo River.

Type. Adult female. B.M. no. 5. 5. 9. 70. Original number 7. Collected 18th July, 1904, by Dr. W. J. Ansorge. Seven specimens.

The type of *sybilla* was captured at the same time of year as that of *induta*, so that the difference in the fur is not seasonal. Dr. Ansorge also obtained examples of this pretty mouse in November and December. In *L. b. marica* the molars are only 2·6 mm. in length.

Leggada paulina, sp. n.

Intermediate between the two West-African species *L. musculoides* and *setulosa*.

Size markedly less than in *setulosa*, rather greater than in *musculoides*. General colour greyish mouse-colour above, with a wash of drabby or buffy along the cheeks, shoulders, and flanks. Under surface pure white, not so sharply defined as in *musculoides*. Ears small, as in *musculoides*. Forearms tinged with buffy, legs greyish; hands and feet white. Tail so thinly haired as to appear naked to the unaided eye, the fine hairs brown above, whitish below; the scales brown throughout.

Skull intermediate between those of *setulosa* and *musculoides*. Brain-case rounded, not so flattened as in *musculoides*. Masseteric knob of zygomatic plate near its anterior border.

Dimensions of the type (measured in flesh):—

Head and body 67 mm.; tail 48; hind foot 13·7; ear 9·5.

Skull: greatest length 18·2; condylo-incisive length 16·5, zygomatic breadth 9; nasals 6·7; interorbital breadth 3·6; breadth of brain-case 8·4; palatine length 7·9; palatal foramina 3·9; upper molar series 3.

Hab. Bitye, Ja River, S.E. Cameroons. 2000′.

Type. Adult female. B.M. no. 14. 1. 24. 27. Original number 694. Collected 15th September, 1913, by Mr. G. L. Bates.

Though evidently allied to *L. musculoides*, of which it may

be a Cameroons representative, this mouse is distinguishable by its larger skull and darker coloration, in which latter it nearly resembles the common Cameroons *L. setulosa*, in whose company it was captured, and for whose young it might readily be mistaken.

LII.—*Contributions to a further Knowledge of the Rhynchotal Family* Lygæidæ. By W. L. Distant.

Continued from p. 270.

Astacops tigrinus, sp. n.

Head, pronotum, scutellum, and corium pale ochraceous; antennæ black, basal joint ochraceous; apices of the stylate eyes black; body beneath pale ochraceous with prominent transverse, somewhat broad, black fasciæ, the most prominent being at the anterior margins of the mesosternal and metasternal, and at the posterior margins of the abdominal segments, there is also a small black spot on each side of the anterior marginal area of the prosternum and a central black longitudinal fascia on the apical abdominal segment; legs black, anterior and intermediate femora (excluding bases), apical third of posterior femora, and extreme bases of tibiæ ochraceous; tarsi mostly black; antennæ with the second and fourth joints subequal in length, each a little longer than third; scutellum transversely subconvex on basal area, centrally thence to apex strongly carinate; membrane black, apical margin pale and passing the abdominal apex.

Long. 12 mm.

Hab. Philippine Islands; Mindoro Island, Baco River (*J. J. Mounsey*).

Scopiatus nigripes.

Scopiatus nigripes, Dist. Ann. & Mag. Nat. Hist. (7) xii. p. 533 (1903).
Astacops mucampis, Berg. Phil. Journ. Sci. xiii. p. 37 (1918).

Hab. Queensland.

Macropes simoni, sp. n.

Head, pronotum, scutellum, body beneath, and legs black; antennæ piceous, apical joint black; hemelytra pale creamy yellow, clavus brown, vein outside clavus also brown, nearly

apical half of corium black; membrane with the base black, and with a large discal spot fuscous with the veins black; antennæ with the first and second joints subequal in length, each a little shorter than fourth; rostrum passing the anterior coxæ; pronotum with the anterior lobe smooth, shining, black, punctate anteriorly and laterally, with two finely impressed central longitudinal lines, posterior lobe more opaque and thickly punctate, anterior lobe not prominently broadened as in *M. philippinensis*, Dist., but gradually somewhat convexly narrowed to apex; membrane reaching or very slightly passing the anterior margin of the apical abdominal segment; scutellum centrally, longitudinally carinate.

Var. Abdomen beneath and the legs brownish ochraceus.

Long. 5–5½ mm.

Hab. Philippine Islands (*E. Simon*).

A species readily distinguished from *M. philippinensis*, Dist., by its small size and structure of the pronotum, &c. Bergroth has recently described another small species, *M. lacertosus*, from the same habitat, but, as he states "pronotum in the male with the greatest width before the middle" and with different colour-markings to the "elytra," it cannot be confused with his specific creation.

Dinomachus marshalli, Dist. Ann. & Mag. Nat. Hist. (7) viii. p. 473 (1901).

Bergroth, my constant but by no means infallible critic, has recently (Medd. Mus. Zool. Acad., Gothenburg, p. 6, 1911) referred to my very short and quite misleading "description of the genus." He states that I have "omitted the most important character of *D. marshalli*, viz., the extraordinary length of the rostrum, which reaches the middle of the abdomen." As I had only an imperfect specimen before me when I wrote my description I described the imperfect condition of the antennæ, I could not describe a mutilated rostrum. However, few regard Bergroth's animadversions too seriously.

Add. Hab. Mashonaland; Salisbury (*Marshall*). Mozambique; Bazi River, Zululand (*Bell-Marley and Warren*). Transvaal; Lydenburg (*Kraatz*); Natal, Durban (*Bell-Marley*)—Brit. Mus.

In the above series the length varies from 8 to 11½ mm.

I have already described species of *Dinomachus* from the Oriental Region, and I now add another two species from Australia.

Dinomachus kurandæ, sp. n.

Head black with a basal spot between the ocelli and the apex of the central lobe ochraceous; pronotum ochraceous, somewhat thickly, coarsely, darkly punctate; narrow lateral and anterior margins, a slender central longitudinal carination, and two similar but oblique carinations on posterior lobe dull ochraceous; scutellum very coarsely darkly punctate, a central longitudinal carination on posterior half, which apically bifurcates on each side, ochraceous; corium ochraceous, thickly, coarsely, darkly punctate, the lateral margins very narrowly ochraceous, apical angles ochraceous with a small black spot; membrane bronzy brown; body beneath imperfectly seen in carded type; legs very pale ochraceous, subapical areas of the femora and annulations to the tibiæ and tarsi castaneous; antennæ pale ochraceous, apex of the second joint and nearly the whole of the third and fourth joints pale brownish, second joint much the longest, third and fourth joints almost subequal in length, first joint distinctly passing apex of head; rostrum imperfectly seen in carded type.

Long. 7 mm.

Hab. Queensland; Kuranda (*F. P. Dodd*).

Dinomachus doddi, sp. n.

Head castaneous, coarsely punctate, apex of central lobe and a central longitudinal line between ocelli ochraceous; pronotum ochraceous, somewhat darkly punctate, a broad, subanterior, transverse fascia, two central longitudinal spots at base, and a submarginal line on posterior lobe castaneous; scutellum castaneous, coarsely punctate, a central longitudinal carinate line obliquely branching on each side of apex castaneous; corium ochraceous, coarsely punctate, its extreme apical margin piceous; membrane pale bronzy; body beneath castaneous; rostrum, coxæ, legs, disk, apex and segmental marginal spots to abdomen beneath ochraceous; rostrum about reaching the intermediate coxæ; sternum very coarsely punctate; antennæ ochraceous, apices of the first, second, and third joints and nearly the whole of fourth joint pale castaneous, second joint longest, third a little longer than fourth; pronotum with a central longitudinal carinate line and with the subanterior transverse fascia slightly globose and very sparingly punctate.

Long. 8 mm.

Hab. Queensland; Kuranda (*F. P. Dodd*).

Masoas transvaaliensis, Dist. Ann. & Mag. Nat. Hist. (7) xviii. p. 290 (1906).

The type of this species was from the Transvaal (Pretoria); the Brit. Mus. now contains two other specimens from Angola which are slightly larger, measuring in length 4½ mm. The type has only a dimension of 3½ mm.

Oxycarenus collaris, Muls. & Rey. Ann. Soc. Lin. Lyon, 1852, p. 102; Oshan, Verz. Pal. Hem. Bd. 1, Heteropt. p. 300 (1906).

This Palæarctic species, as hitherto understood, must now be also included in the Oriental fauna, as the British Museum has recently received specimens from the Agricultural College, Poona. It was found "infesting in large numbers the capsules of the safflower plant grown in Poona" (*Harold Mann*).

Maruthas bicolor.

Maruthas bicolor, Dist. Nov. Caledon. 1, L. iv. p. 379, pl. xi. fig. 5 (1914).

Oxycarenus bicoloratus, Berg. Phil. Journ. Sci. xiii. p. 73 (1918).

Hab. New Caledonia.

Ukrada apicicornis, Sign. in Maillard, Notes sur l'Ile de la Réunion, Ins. p. 28, pl. xx. fig. 8 (1862).

This very widely distributed species can now be recorded from Queensland; Kuranda (*F. P. Dodd*).

Pamera tricolorata, sp. n.

Head, pronotum, and scutellum black; corium dark castaneous; apex of scutellum and lateral marginal area of corium to beyond middle ochraceous, on apical area of corium two pale ochraceous or greyish spots in transverse series, in some specimens these spots are united and in others they are practically absent; membrane brownish ochraceous; body beneath and legs black; apices of femora, basal areas of intermediate and posterior femora, and the whole of the tibiæ and tarsi ochraceous; antennæ piceous, second joint paler, fourth joint with basal half pale ochraceous, second joint a little longest, third and fourth almost subequal in length; anterior lobe of pronotum with a distinct anterior collar, convex, a little longer than posterior lobe but narrower, the posterior lobe somewhat coarsely punctate; scutellum centrally longitudinally carinate, the carination

bifurcate towards base; corium, excluding lateral marginal area, more or less thickly punctate; membrane not passing abdominal apex; rostrum reaching or slightly passing anterior coxæ.

Long. 6–7 mm.

Hab. Queensland; Kuranda (June–July, *R. E. Turner*; April, *F. P. Dodd*). Adelaide River (*J. J. Walker*). Tenimber Island (*W. Doherty*).

Pamera vincta, Say.

This very widely distributed species has now been received from Queensland (Townsville), where it was taken by Mr. F. P. Dodd.

Austropamera, gen. nov.

Head long, antocular portion about as long as postocular, but the antocular portion acuminately apically produced; eyes moderately prominent; ocelli situate a little behind a line between the posterior margins of the eyes; antennæ inserted a little in front of eyes, first joint about as long as head, second longest, pronotum with a narrow anterior collar about as long as broad at base, strongly laterally sinuate, the anterior lobe subglobose and shorter than the posterior lobe; rostrum slightly passing the anterior coxæ, first joint not reaching base of head; scutellum about as broad at base as long, obliquely transversely ridged; corium elongate; membrane reaching abdominal apex; anterior femora strongly incrassated; body beneath with the apical lateral angle of the posterior abdominal segment moderately acute.

Allied to the Oriental genus *Pamerana*, Dist., from which it differs by the non-spinuous antenniferous tubercles, the much longer postocular area of the head, &c.

Austropamera turneri, sp. n.

Head and pronotum black, posterior pronotal area strongly punctate; ocelli red; antennæ dull ochraceous, apices of the first and second joints, the whole of third, and about basal half of fourth joint black, basal joint about as long as head, second longest; scutellum black, centrally, obliquely transversely testaceously ridged; corium dull ochraceous, clavus and outer clavel area darkly punctate, a broad, transverse, black fascia beyond middle and the apical areas black; membrane dull black; head beneath and sternum black;

abdomen dull dark castaneous, with an ochraceous lateral marginal spot a little beyond middle; rostrum and anterior legs castaneous, extreme femoral apices and bases of tarsi ochraceous; anterior and posterior legs ochraceous, apices of femora castaneous; other structural characters as in generic diagnosis.

Long. 7½ mm.

Hab. Queensland; Kuranda, 1–100 feet (*R. E. Turner*, May and June).

ARRIANOIDES, gen. nov.

Head elongate, about as long as breadth between eyes, narrowed towards apex; eyes not projecting beyond the pronotal angles; first joint of antennæ distinctly passing apex of head; pronotum about as long as broad, transversely impressed at middle, the lateral margins very slightly amplia tly produced, moderately narrowed from bases to anterior margin, anterior lobe moderately convex; scutellum about as long as broad at base, its apex linearly acute, the disk broadly foveate; corium about twice as long as broad; membrane reaching the abdominal apex; anterior femora moderately incrassated and spined beneath on apical area; rostrum imperfectly seen in carded specimen.

Allied to *Arrianus*, Dist., and *Teutates* Dist.

Arrianoides australis, sp. n.

Head, anterior lobe of pronotum, scutellum, and disk of corium black; *posterior pronotal lobe*, claval area, and *extreme lateral margins* to corium more or less castaneous; a large white spot on apical area of pronotum, the extreme apex of which is castaneous; extreme lateral margins and basal angles of pronotum and apical spot to clavus pale castaneous or ochraceous; body beneath imperfectly seen in carded specimen) with the sternum black and the abdomen dark testaceous; antennæ ochraceous, first joint passing apex of head, second longest, third longer than fourth; anterior lobe of pronotum convex and almost impunctate, posterior lobe distinctly punctate, a somewhat obsolete central longitudinal impression neither reaching anterior nor posterior margins; clavus distinctly punctate; femora pale castaneous; tibiæ and tarsi ochraceous; membrane bronzy-brown. Other structural characters as in generic diagnosis.

Long. 5 mm.

Hab. Queensland; Townsville (*F. P. Dodd*).

Poeantius lineatus.

Poeantius lineatus, Stål, En. Hem. iv. p. 162 (1874).
Poeantius brevicollis, Bredd. Deutsch. ent. Zeitschr. 1907, p. 207.

This widely distributed species may now also be recorded from Australia. Queensland; Townsville (*F. P. Dodd*).

Naularensia rolandi, sp. n.

Head, anterior lobe of pronotum, and scutellum glossy black; posterior pronotal lobe and corium more piceous; basal angles of pronotum, narrow lateral margins, and two spots on apical areas of corium dull greyish ochraceous; body beneath shining black; femora shining black, their apices and the tibiæ and tarsi ochraceous, apices of tibiæ and tarsi black; antennæ dull ochraceous, second and fourth joints longest, and almost subequal in length, the apical joint piceous, first joint not reaching apex of head; pronotum about as long as broad at base, transversely constricted behind middle; head and anterior lobe of pronotum glabrous, posterior pronotal lobe thickly coarsely punctate; membrane reaching apex of penultimate abdominal segment; corium sparingly coarsely punctate; rostrum not quite reaching the intermediate coxæ; tibiæ finely spinulose; anterior tibiæ moderately dilated at apices.

Long. 5½ mm.

Hab. S.W. Australia; Yallingup (*R. E. Turner*).

This genus was hitherto only known from Continental India.

Duertae nigricans, sp. n.

Black; apical angular area to corium and posterior half of connexivum ochraceous; body beneath imperfectly preserved specimen; membrane fuscous brown; antennæ with the first joint passing apex of head, second, third, and fourth joints almost subequal in length; head above thickly, finely punctate, obliquely directed from near eyes to apex; pronotum longer than broad, anterior lobe globose, and thickly punctate, about twice as long as posterior lobe, from which it is deeply transversely separated; posterior margin slightly concave; scutellum about as long as broad at base, its extreme apex ochraceous; clavus coarsely punctate; corium more finely punctate; anterior femora strongly globose, posterior femora moderately incrassated, intermediate femora less prominently incrassate.

Long. 8½–9 mm.

Hab. N.S. Wales, Sydney (*J. J. Walker*).

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END OF THE SECOND VOLUME.

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